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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,922	09/24/2003	Gar0 J. Derderian	MI22-2296	8459
21567 7590 04/25/2007 WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EXAMINER AHMADI, MOHSEN	
			ART UNIT	PAPER NUMBER
			2812	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/25/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/671,922

Applicant(s)

DERDERIAN ET AL.

Examiner

Mohsen Ahmadi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 11/29/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 35-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 35-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/24/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 1/26/2007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to the RCE with amendment filed 11/29/2006.

The nonstatutory obviousness-type double patenting rejection is withdrawn in view of applicant's arguments. Currently, claims 35-45 are pending.

#### ***Information Disclosure Statement***

This office acknowledges of the following items from the Applicant: Information Disclosure Statement (IDS) filed on January 26, 2007.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim **36** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. "The **use** of plasma in the atomic layer deposition reaction chamber during the incorporation of at least portions of the molecules into the material to align non-ionized molecules is a new matter not the present of plasma".

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 35, 37-40 and 42-43 is rejected under 35 U.S.C. 102(e) as being anticipated by Chiang et al. (US Pat # 6,630,201).**

Regarding claims 35, 37-40 and 42-43, Chiang et al. shows the method as claimed in figures (35a-d) and (39a-b), and corresponding text, with a substrate 8 subjected to an ALD process (column 27, lines 6-49; column 31, lines 42-62; column 24-33). The substrate is biased so that inherently, there is an electric field gradient and, an electric field inherently has a magnetic field associated with it within an atomic layer deposition reaction chamber to align non-ionized and electrically neutral molecules during the atomic deposition as at least portions of the molecules are incorporated into a material formed over a semiconductor substrate 8 (column 27, lines 6-49; column 31, lines 42-62). Orientation of the molecules to the substrate is disclosed (column 31, lines 42-62). A new configuration for the electric field gradient is inherent since the change in the deposition parameters for the new material will require a different condition.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 41 and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. (US Pat # 6,630,201) in view of Norman et al. (US Pat # 6,869,876).**

**Regarding claims 41 and 44-45**, Chiang shows the method as claimed in figures 30-31, (35a-d) and (39a-b), and corresponding text, with a substrate 8 subjected to an ALD process with plasma (column 23-33, lines 35-67; column 27, lines 6-49, column 31, lines 42-62). The substrate is biased so that inherently, there is an electric field gradient and, an electric field inherently has a magnetic field associated with it. Orientation of the molecules to the substrate is disclosed (column 31, lines 42-62). A new configuration for the electric field gradient is inherent since the change in the deposition parameters for the new material will require a different condition.

Chiang et al. disclose all of the claimed features as stated above except wherein the first molecules are ammonia and the second are  $\text{SiCl}_4$ , the vector limitations in claim 44 and that the angular difference between the first and second vectors is about 180 degrees.

Norman teaches an ALD process wherein ammonia is used as a precursor. It would have been obvious to one of ordinary skill in the art to have had the first molecules be ammonia and the second are  $\text{SiCl}_4$ ; to have had the vector limitations in claim 44 and to have had the angular difference between the first and second vectors be about 180 degrees, in the method of Chiang et al., with the motivation that if silicon nitride deposition is desired in the device, as taught in Norman et al., ammonia and  $\text{SiCl}_4$  would be obvious precursors to form the silicon nitride layer; with the motivation that the vector relationship is dependent upon the desired rate of deposition, the precursor/molecules being deposited, so that the bias on the substrate (positive or

negative, with respect to the chamber, which would give the 180 degree difference in the vector) may be optimized to suit the needs of the process and of the desired result.

### ***Response to Arguments***

Applicant's arguments filed 11/29/2006 have been fully considered but they are not persuasive. The Examiner directs the applicant to the cited sections (column 27, lines 6-49; column 31, lines 42-62) and figures (35a-d and 39a-b) where Chiang et al. teaches two steps, the first step is shown in figure 35a, where the gaseous precursor 392 is not ionized (because gaseous precursor 392 has no reaction with substrate 8) and second step is shown in figure 35c, where the plasma 194 is present in the process chamber (where ions 400 are ionized).

For further clarification, the Examiner directs the applicant to the Chiang et al. where Chiang et al. clearly states that the deposition cycle includes two steps (See column 27. lines, 11-49).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohsen Ahmadi whose telephone number is 1-571-272-5062. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 1-571-272-1873. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MA



MICHAEL LEBENTRITT

SUP

EXAMINER